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בקשה לפטנט
Application for Patent

אני, (שם המבקש, מענו – ולגבי גוף מאוגד – מקום התאגדותו)
I (Name and address of applicant, and, in case of a body corporate, place of incorporation)

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(בעברית) שיטת הדמיה דיגיטלית ליצירת הרשת לשימוש בהדפסת-רשת
(Hebrew)

(באנגלית) METHOD FOR PRODUCING A DIGITALLY IMAGED SCREEN FOR USE IN A SCREEN PRINTING PROCESS
(English)

מבקש בזאת כי ינתן לי עליה פטנט.
hereby apply for a patent to be granted to me in respect thereof.

* בקשת חלוקה – Application for Division	* בקשת פטנט מוסף – Application for Patent of Addition	* דרישת דין קדימה Priority Claim		
מבקשת פטנט from Application	* לבקשה/לפטנט to Patent/Appl.	מספר/סימן Number/Mark	תאריך Date	מדינת האיגוד Convention Country
No. מס'	No. מס'			
dated מיום	dated מיום			

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METHOD FOR PRODUCING A DIGITALLY IMAGED SCREEN FOR USE IN A SCREEN PRINTING PROCESS

SCITEX CORPORATION LTD.
C: 1019

METHOD FOR PRODUCING A DIGITALLY IMAGED SCREEN FOR USE IN A SCREEN PRINTING PROCESS

FIELD OF THE INVENTION

The present invention relates to screen printing methods, and more particularly, to a novel method for the digital production of printing screens using ink jet printing technology.

BACKGROUND OF THE INVENTION

One of the most widely used methods of printing uses a screen. The basis of the screen is a woven thread with a net-like structure of holes. Early screens were fabricated from silk, but partly because of the expense of this material and partly from the point of view of performance, silk has been replaced by nylon, polyester or even metal. The screen is selectively blocked so that ink will pass through only in areas which are necessary to print. Screens come in a variety of mesh openings and thicknesses, depending on the particular application. The screen serves as a support for the blocking material, supporting portions of the blocking material which are unconnected and would otherwise be unsupported. For instance, in printing the letter 'O', in order to allow ink to form the

outside of the letter without filling the center, there must be blocking material in the center of the letter. The screen serves to support this center blocking material so that it cannot fall out of the stencil. The screen is tensioned on a frame and ink is pressed onto the stencil with a squeegee so that it is applied to a substrate placed below the screen in those places where it is necessary to print.

The screen printing process is used with inks formulated to adhere to a large variety of surfaces, and the printing process itself can handle a large variety of shapes. This makes screen printing the most versatile of printing processes and it is widely used to print on textiles, packaging, china-ware, glass, plastics, wood and metals, printed circuit boards and posters.

In order to make a screen, it is necessary to prepare artwork, then to photograph it to produce a positive film that in turn can be used to produce the exposed pattern on the photosensitive screen coating. Such original artwork may now be most easily prepared using a computer. The digital information in the computer is then used in an image-setter to produce the positive film. There are a variety of prior art photographic methods of producing the stencil.

In the direct method, solutions of light-sensitive coatings are applied directly onto the screen, then dried and hardened into a printing pattern by exposure to ultraviolet (UV) light through a positive film in which the image areas are opaque to UV light. After exposure, the unexposed, unhardened coating is washed away allowing ink to pass through.

There are other, indirect methods of producing the stencil. The light sensitive coating may be prepared as a pre-sensitized film on an intermediate base. The film can then either be transferred onto the screen before exposure and development or after exposure and development.

There is a growing need in many markets to print low run lengths and print on demand. This is because it is expensive to carry large stocks of pre-printed items and because there is an increasing demand for product customization to the need of individual customers or to relatively small groups of customers instead of mass production. The speed and cost of screen production becomes important and any means of simplifying and reducing costs is advantageous. There is also a trend to use computers to prepare artwork for printing and it would obviously be more convenient if the screen could be prepared directly from the computer information without recourse to the preparation of an intermediate photomask.

Therefore, it would be desirable to provide a method for screen printing which would not require the production of an intermediate positive film, would allow screen masters to be imaged directly from digital information in the computer so as to simplify the known work flow of the printing process, and would make it quicker and more economical. In addition, it would be desirable to produce a simple means of processing an ink jet masking image into a finished screen stencil.

SUMMARY OF THE INVENTION

Accordingly, it is a broad object of the present invention to overcome the problems of the prior art and provide a method for producing a digital screen directly from digital information in the computer in an economical fashion.

In accordance with a preferred embodiment of the present invention, there is provided a method for producing a digitally imaged screen, said method comprising the steps of:

creating a digital image on a computer system;

providing an image-ready printing blank comprised of a photosensitive layer coated on a screen;

printing said digital image in UV-blocking ink on said photosensitive layer with an ink-jet printer, forming an image structure having exposed and unexposed areas of said photosensitive layer;

flood-curing said photosensitive layer having said formed image structure with UV light such that said exposed areas of said photosensitive layer are cured while said unexposed areas of said photosensitive layer are blocked from UV curing by said UV-blocking ink; and

washing said photosensitive layer so that said UV-blocking ink and said unexposed image structure areas are removed,

such that the remaining cured areas of the photosensitive layer form a mask on said screen for use in the screen printing process.

In accordance with another aspect of the invention there is provided a screen printing blank usable in a screen printing process, said printing blank comprising:

an image-ready printing blank comprised of a photosensitive layer coated on a screen;

said printing blank having been imaged with a digital imaging system using an ink-jet printer and UV-blocking ink, forming an image structure having exposed and unexposed areas of said photosensitive layer;

said printing blank having said formed image structure having been flood-cured with UV radiation such that said exposed areas of said photosensitive layer are cured while said unexposed areas of said photosensitive layer are blocked from UV curing by said UV-blocking ink; and

said printing blank having been washed so that said UV-blocking ink and said unexposed image structure areas are removed,

such that the remaining UV cured areas of the UV curing layer form a mask on said screen for use in the screen printing process.

In a preferred embodiment, a screen is provided with a photosensitive layer, and a digitally determined image from a computer is printed on the screen by means of an inkjet printer. It is preferable to use a flat bed ink-jet imaging system so that the screen can be stretched in a frame and directly placed under the ink-jet head. The ink used need not have strong colorant, but functions as a UV mask and thus must contain a UV absorbing pigment. The ink is not absorbed into the photosensitive layer, but remains as an undried image on the surface. The ink must remain wet so that that it does not spread and

therefore gives a sharp image, and so that the UV absorbent material remains concentrated. The solvent of the ink must be chosen so as to assure that it will not affect the screen.

The screen is then irradiated with UV, and the areas which have been printed with ink serve to mask the photosensitive layer from the UV light, while those areas having no ink are exposed so that the photosensitive layer is polymerised by the UV.

After the UV irradiation stage, the screen is washed so as to remove the ink and the unpolymerised photosensitive layer. Any liquid that is suitable for washing out the unpolymerised photosensitive layer will also wash away the ink. This leaves the screen with only the polymerised areas of the photosensitive layer that create the blocked areas through which the ink will not pass.

Thus, the inventive method provides a digitally imaged screen, directly from a digital image in the computer, which can then be used in any conventional screen printing process.

Other features and advantages of the invention will become apparent from the following drawings and descriptions.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention with regard to the embodiments thereof, reference is made to the accompanying drawings, in which like numerals designate corresponding elements or sections throughout and in which:

Fig. 1 shows a diagramatic representation of a prior art method of the silk-screen printing process;

Figs. 2a-c depict cross-sectional views of the stages of the prior art method of producing a stencil photographically, previously described as the direct method;

Figs. 3a-e depict cross-sectional views of the stages of the prior art method of producing a stencil photographically, previously described as an indirect method where transfer from an intermediate material to the screen is done after imaging and washing out;

Figs. 4a-d depict cross-sectional views of the stages of the prior art method of producing a stencil photographically, previously described as an indirect method where transfer from an intermediate material to the screen is done before the imaging and washing stages;

Fig. 5 shows a photosensitive screen stencil which has been imaged and washed out according to one of the above described prior art procedures; and

Figs. 6a-e show cross-sectional views of the steps of the process of producing a stencil, in accordance with the method of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The following description begins with a review of prior art methods, shown in Figs. 1-5.

To print in the screen printing method, as shown in prior art Fig. 1, stencil 20 may be used for printing after being tensioned in a metal or wooden frame 22 and having substrate 24 placed beneath it. Stencil 20 must be selectively blocked so that ink 26 can pass through onto the printing substrate 24 only in the areas which are necessary to print. For the simplest type of work, this may be achieved by cutting stencil 20 from a laminated film material and then applying it to screen 28. Ink 26 is pressed onto stencil 20 with squeegee 27 so that ink 26 passes through the unblocked areas of screen 28 onto substrate 24, while ink 26 does not pass through the areas of screen 28 which are blocked by stencil 20.

As mentioned above, the prior art method of producing artwork for silk-screen printing often requires photographing the material. There are a variety of photographic methods of producing stencil 20. A prior art method known as the direct method is shown diagramatically in prior art Figures 2a-c. These figures show cross-sectional views of the structures of screen printing stencils.

As seen in Fig. 2a, stencil 20 is formed by screen 28 to which solutions of light sensitive coatings 30 are applied. Screen 28, represented by cross lines, is filled with photosensitive coatings 30, which are then dried. Positive film 32 is laid on stencil 20. Positive film 32 is comprised of black, UV-opaque image areas and clear, UV-transparent background, or non-image areas, and functions as a UV mask in contact with stencil 20.

Figure 2b shows the exposure of the combination of film image 32 and stencil 20 to flood UV light. Coatings 30 are selectively hardened into a printing pattern by exposure to UV light through positive film 32 in which the image areas are opaque to the UV light. UV light penetrates film image 32 in the non-image areas and cures the corresponding areas of photosensitive coating 30 creating cured, cross-linked polymeric material 34.

Film image 32 is then physically removed and screen 28 is washed with a solvent, which may be water. As seen in Fig. 2c, the washing removes the uncured areas of photosensitive coating 30 leaving only the open woven mesh of screen 28 in these areas, while retaining cross-linked polymeric material 34. Stencil 20 may then be used for printing as described in Fig. 1.

There are other, indirect methods of producing the stencil. The light sensitive coating may be prepared as a pre-sensitized film on an intermediate base. The film can then either be transferred onto the screen before exposure and development or after exposure and development.

Prior art Figures 3a-e show cross-sectional views of an indirect method of transfer from an intermediate material to the screen after the imaging and washing stages. Figure 3a shows the donor sheet, characteristically a UV transparent substrate 36, comprised of a material such as polyester, coated with a photosensitive layer 38. A positive film serves as photomask 40 and is laid in contact with layer 38. Figure 3b depicts a UV exposure through photomask 40 onto layer 38. Where the UV is not blocked by photomask 40, layer 38 is hardened by polymerisation. The areas of layer 38 which were directly under

the UV opaque areas of photomask 40 remain unaffected. Photomask 40 is then physically removed and the surface of layer 38 is washed, usually with either an organic solvent or a weak alkali solution. This solution washes out the unpolymerised areas, leaving the polymerised areas of layer 38 as depicted in Figure 3c. Layer 38 is then pressed in contact with screen 28 as shown in Figure 3d and either by means of pressure, heat or solvent, is transferred to the screen as shown in Figure 3e, thus providing areas in which the ink is blocked, for the screen printing process.

Prior art Figures 4a-d describe an indirect transfer process where transfer from an intermediate material to the screen is done before the imaging and washing stages. Figure 4a shows support 42 coated with photosensitive layer 38 being pressed together with the screen 28, so as to transfer the photosensitive material to screen 28. As in Fig. 3, the transfer may be affected either by heat or pressure or a combination of these, or by solvent, possibly combined with heat and pressure. Support 42 is then physically peeled away and the resulting screen is shown in Fig. 4b. UV flood exposure through photomask 40 is shown in Fig. 4c. This cures the areas which are not blocked by photomask 40. After subsequent washing, as previously described, a print-ready screen results, as shown in Fig. 4d.

Fig. 5 shows a photosensitive screen stencil which has been imaged and washed according to one of the above described procedures. The image areas show the exposed screen through which ink may pass during printing.

Referring now to Figs. 6a-d, which describe the present invention. Fig. 6a shows screen 28 with a phosensitive layer 38 coated within the screen. Commercial screens

which are available and can be used in this invention have been described in the background above, in Fig. 2a (excluding photomask 26) and Fig. 4b.

Fig. 6b shows an ink jet head 44 jetting an inkjet ink 46 onto the surface of photosensitive layer 38 of screen 28. The system shown is, by way of example, a generic impulse (drop-on-demand) system, although any type of ink jet system is usable in this invention. In this system, ink supply 48 is delivered at atmospheric pressure. Piezo-electric crystal 50 produces a pressure wave along arrow "A" upon actuation by an electric signal. This pressure wave causes the ejection of a droplet of inkjet ink 46 from ink-jet nozzle 52. A data pulse train 54 produces a pattern of dots as ink-jet head 44 traverses the surface of screen 28 depositing image 56.

Thus, inkjet ink 46 is deposited in a pattern that is digitally determined to provide the information directly from a computer that will be printed by the screen by a conventional screen printing process. It is essential to the invention that inkjet ink 46 is not absorbed into the photosensitive layer, but remains as an undried image on the surface. This has various advantages which will be explained below. It is also essential that the surface of photosensitive layer 38 has good wetting properties so that when ink droplets 46 impact the surface they spread evenly without reticulation.

Figure 6c shows the imaged screen being irradiated with UV radiation. In this case, inkjet ink 46 forms a barrier to the radiation. Preferably, it contains carbon black as the UV absorbing pigment, but dyes or pigments with strong absorption in the UV region may also be used. Ink 46 need have very little actual colorant that is evident to the naked eye, just a sufficient amount to make it visible for following the imaging procedure. The UV

absorption function of the dye is more important. As the ink remains wet and is not absorbed into photosensitive layer 38 but remains on the surface, the ink does not spread into layer 38 and therefore gives a sharp image with concentrated pigment or dye or other UV absorbent material. Where there is no inkjet image 56, the radiation polymerizes photosensitive layer 38 and thus reduces its solubility in the developing liquid.

As seen in Fig. 6d, the next stage of the inventive process is to wash out the unpolymerised photosensitive layer 38 together with the ink jet image. Because the inkjet image is wet, it is easily removed by any liquid that is suitable for washing out the uncured coating. Preferred liquids are weak aqueous alkali solutions such as sodium carbonate dissolved in water or mixtures of water with surfactants and other additives such as organic solvents (generally less than 20% of the developer by weight). This leaves the screen 28 with only the hardened areas of photosensitive layer 38 that create the blocked areas through which ink will not pass.

As seen in Fig. 6e, after washing, the screen may undergo a further UV hardening stage to increase resistance to any solvents that may be used in inkjet ink 46.

The process is very simple and versatile. Screens prepared by any of the prior art methods shown in Figs. 2 to 4 can be used, as long as they have good surface wetting properties. Such screens are widely available commercially. Any available ink jet technology, including drop-on-demand or continuous ink jet can be used. However, it must be ensured that the solvent of the ink is such that it does not attack the screen. Water-based ink-jet inks are usually suitable. Phase change (wax) inks have the

disadvantage that they are not so easily removed during the screen washing out stage and may require a separate washing procedure.

Generally, it is preferable to have a flat bed ink-jet imaging system so that the screen that is stretched in a frame can be directly placed under the ink-jet head. The wet imaged screen is then exposed by transferring the frame so that it resides horizontally below a UV exposure unit that irradiates the surface of the imaged screen from above. Washing of the exposed screen can be accomplished with the solutions recommended by the screen manufacturer.

The preferred type of composition of photosensitive layer 38 has the following three components:

1. Component (A) -- between 35% and 75% by weight: UV-curable resins, i.e. oligomers and monomers that can be cross-linked, in the presence of a photoinitiator, by means of irradiation with ultra violet light.

2. Component (B) -- up to 10% of the weight of component (A): photoinitiators and synergists that will generate and promote free radicals needed for the cross-linking reaction of component (A).

3. Component (C) -- from 10% to 50% by weight: binder resins that must be soluble in water or dilute alkali, as well as in non-aqueous (organic) solvents. Due to the presence of the binder resin, the uncured film has good wetting properties – especially suitable for the surface absorption of aqueous ink jet inks.

In addition, there are optional ingredients, such as fillers and wetting agents, as well as dyes or pigments to aid visual examination of photosensitive layer 38. The entire mixture

may be coated from a non-aqueous solvent directly onto screen 28. Preferably, it is deposited onto a release coating either on paper or film and either in a partially dry state or in a hot and sticky state screen 28 is pressed onto the coating so that after drying and cooling photosensitive layer 38 is absorbed and bonded into the surface of the screen 28 as shown in Figure 4C. Coating thickness preferably is 20 microns, but can be between 10 microns and 60 microns, in order to obtain maximal difference in solubility between cured and uncured regions and optimise print quality and screen robustness.

The three components of photosensitive layer 38 preferably consist of materials showing suitable duality of solubility in both aqueous and non-aqueous solvents. This would exclude resins such as polyvinyl chlorides, which may be soluble in organic solvents but not in water, and polyvinyl alcohols, which are not soluble in non-aqueous solvents. The resin system used for component (C) must be soluble in organic solvents, so that the monomers and oligomers of component (A), as well as the photoinitiators of component (B), will dissolve easily and, upon application, will yield a compatible dry film. The resins must also have aqueous solubility so that the uncured layer provides suitable surface wetting properties and can be washed away, as described below.

Although it would be possible to make a system where the layer is washed away with an organic solvent, this is environmentally not desirable. Examples of types of resins that are useful in the system are Novalaks (functionally substituted phenol-formaldehyde resins), styrene maleic anhydride copolymers, polyvinyl methyl ether/ maleic anhydride copolymer and its esters, hydroxy propyl cellulose and esterified rosin-maleic esters and maleic resins with acid values of at least 50.

The following is an example of the components used in screen blank fabrication, imaging and treatment to produce a finished screen.

EXAMPLE I

The following composition was made up (parts by weight) and milled in a ball mill for 2 hours;

Methyl Ethyl Ketone	205 parts
Kaolin	34 parts
Ebecryl 150	20 parts
Cab-O-Sil M5	8.6 parts

After milling, the following ingredients (all parts by weight) were added and stirred in, one by one.

Scripset 550	21 parts
Ebecryl 1259	110 parts
Alsynol RC 12	25 parts
Irgacure 184	2.8 parts
Irgacure 907	4.3 parts
Speedcure ITX	1.14 parts
BYK 307	1.32 parts
Sudan Black B	0.17 parts

The mixture was bar coated onto a silicone coated release paper. The mixture was air dried for 30 seconds and a commercially available woven polyester fabric suitable for graphics arts printing was pressed onto the coating. As the coating still retained solvent, the polyester fabric penetrated the surface. The sandwich was then dried at 140°C for 2 minutes to give a dry weight of coating of the above formulation of 25 grams per square

meter. By this process, this coating was firmly bonded onto the surface of the polyester fabric.

The coated fabric was then tensioned in a frame and placed on an XY bed where it was imaged using the inkjet printhead described in Patent No. EP640481 assigned to Scitex. The ink used in this head was Epson ink, coded SO20010.

The imaged screen was then exposed to a UV source and then developed by washing with a solution of the following composition;

Deionised water	1050 g
Sodium carbonate	6.6g
Benzyl alcohol	12.0g
Sodium lauryl sulphate	5.4 g

The washing solution removed the ink as well as the unhardened photopolymeric layer. The screen was then further hardened by UV exposure and could then be used for conventional screen printing.

SOURCES OF TRADE NAMED RAW MATERIAL

Alsynol RC12 Rosin-maleic resin esterified with pentaerithritol. Manufactured by DSM 3150 AA Hoek van Holland.

BYK 307 Polyether modified polydimethyl siloxane. Manufactured by BYK-Gardner GmbH, Geretsried, Germany.

CAB-O-JET 200 Aqueous dispersion of carbon black. Manufactured by Cabot Corporation, Billerca, Massachusetts, US.

Cab-O-Sil M5 Fumed silica. Manufactured by Cabot Corporation, Billerca, Massachusetts, US.

Ebecryl 150 Bisphenol A derivative of diacrylate oligomer. Manufactured by UCB Chemicals, Basle, Switzerland.

Ebecryl 1259 Aliphatic trifunctional urethane acrylate diluted with 35% hydroxy propyl methacrylate. Manufactured by UCB Chemicals, Basle, Switzerland.

Irgacure 184 1-hydroxy-cyclohexyl-phenyl-ketone. Manufactured by Ciba Geigy Corporation, CH-4002, Basle, Switzerland.

Irgacure 907 2-Methyl-1[4-(methylthio)phenyl}-2-morpholino-propan-1-one. Manufactured by Ceba-Geigy Corporation, CH-4002, Basle, Switzerland.

Scripset 550 Secondary butyl ester of styrene-maleic anhydride copolymer. Manufactured by Solutia Europe NV/S.A. Louvain-La-Neuve(Sud), Belgium.

Speedcure ITX Isopropylthioxanthone. Manufactured by Lambson, Castleford, UK.

Sudan Black B Dye. Manufactured by BDH Laboratories, Poole, Dorset, England

Q2-5211 Super-wetting agent. Manufactured by Dow Corporation, Midland, MI, USA.

Having described the invention with regard to certain specific embodiments thereof, it is to be understood that the description is not meant as a limitation, since further modifications may now suggest themselves to those skilled in the art, and it is intended to cover such modifications as fall within the scope of the appended claims.

Claims:

1. A method for producing a digitally imaged screen, said method comprising the steps of:

creating a digital image on a computer system;

providing an image-ready printing blank comprised of a photosensitive layer coated on a screen;

printing said digital image in UV-blocking ink on said photosensitive layer with an ink-jet printer, forming an image structure having exposed and unexposed areas of said photosensitive layer;

flood-curing said photosensitive layer having said formed image structure with UV light such that said exposed areas of said photosensitive layer are cured while said unexposed areas of said photosensitive layer are blocked from UV curing by said UV-blocking ink; and

washing said photosensitive layer so that said UV-blocking ink and said unexposed image structure areas are removed,

such that the remaining cured areas of the photosensitive layer form a mask on said screen for use in the screen printing process.

2. The method of claim 1 further comprising the step of flood-curing said photosensitive layer with UV radiation after said washing step.

3. A method of producing a digitally imaged screen print comprising the steps of:

producing a digitally imaged screen in accordance with the method of claim 1, and

using said digitally imaged screen in a screen printing process.

4. A screen printing blank usable in a screen printing process, said printing blank comprising:

an image-ready printing blank comprised of a photosensitive layer coated on a screen;

said printing blank having been imaged with a digital imaging system using an ink-jet printer and UV-blocking ink, forming an image structure having exposed and unexposed areas of said photosensitive layer;

said printing blank having said formed image structure having been flood-cured with UV radiation such that said exposed areas of said photosensitive layer are cured while said unexposed areas of said photosensitive layer are blocked from UV curing by said UV-blocking ink; and

said printing blank having been washed so that said UV-blocking ink and said unexposed image structure areas are removed,

such that the remaining UV cured areas of the UV curing layer form a mask on said screen for use in the screen printing process.

5. The printing blank of claim 4 wherein said photosensitive layer comprises wetting agents.

6. The printing blank of claim 4 wherein said photosensitive layer is between approximately 10 and 60 microns in thickness.

7. The printing blank of claim 6 wherein said photosensitive layer is approximately 20 microns in thickness.

8. The printing blank of claim 4 wherein said photosensitive layer comprises UV-curable resins, photoinitiators, synergists and binder resins.

9. The printing blank of claim 8 wherein said UV-curable resins are present as between approximately 35%-75% by weight of said photosensitive layer.

10. The printing blank of claim 8 wherein said photoinitators and synergists are present as up to approximately 10% of the weight of said UV-curable resins.

11. The printing blank of claim 8 wherein said binder resins are present as approximately 10%-50% by weight of said photosensitive layer.

12. The printing blank of claim 8 wherein said binder resins are soluble in both aqueous and non-aqueous solvents.

13. The printing blank of claim 4 wherein said photosensitive layer comprises at least one of dyes and pigments which are added to aid visual examination of the layer.

14. The printing blank of claim 4 wherein said binder resins include at least one of novalak, styrene maleic anhydride copolymers, polyvinyl methyl ether/maleic anhydride copolymer and its esters, hydroxy propyl cellulose and esterified rosin-maleic esters, and maleic resins with acid values of at least 50.

15. The printing blank of claim 4 wherein said ink-jet printer is a flat-bed imaging system.

16. The printing blank of claim 4 wherein said ink-jet printer is part of a generic impulse system.

17. The printing blank of claim 4 wherein said ink-jet printer is part of a continuous ink-jet system.

18. The printing blank of claim 4 wherein said ink remains wet during the imaging process and is not absorbed into said photosensitive layer.

19. The printing blank of claim 4 wherein said ink is comprised of carbon black.

20. The printing blank of claim 4 wherein said ink is comprised of a UV absorbing pigment or dye.

21. The printing blank of claim 4 wherein said ink is water-based.

22. The printing blank of claim 4 wherein said wash is an aqueous alkali solution.

23. The wash of claim 22 wherein said wash comprises aqueous sodium coarbonate.

24. The wash of claim 22 wherein said wash comprises less than approximately 20% organic solvents.

25. A method for preparing a screen printing blank usable in a screen printing process, substantially as described herein by way of example and with reference to the drawings.

26. A screen printing blank usable in a screen printing process, substantially as described herein by way of example and with reference to the drawings.

For the Applicant:

Edward Langer, Adv. & Pat. Atty.
C:1019

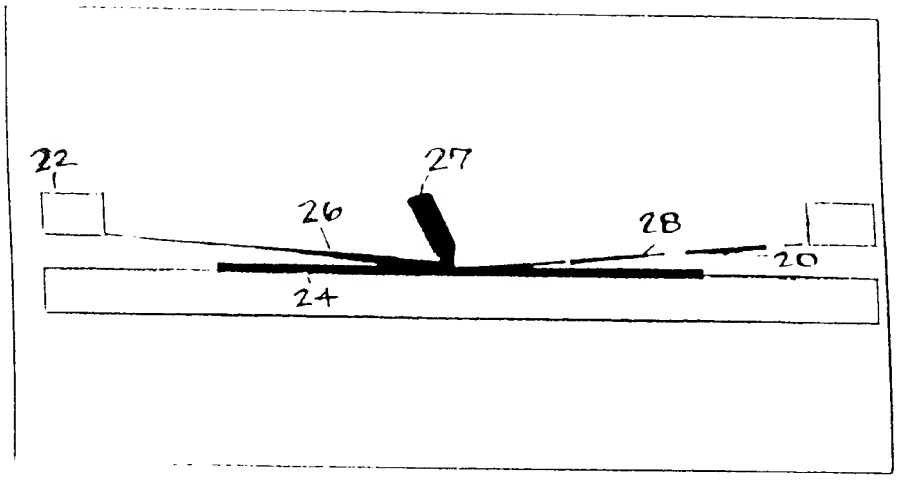

Fig. 1 - Prior Art

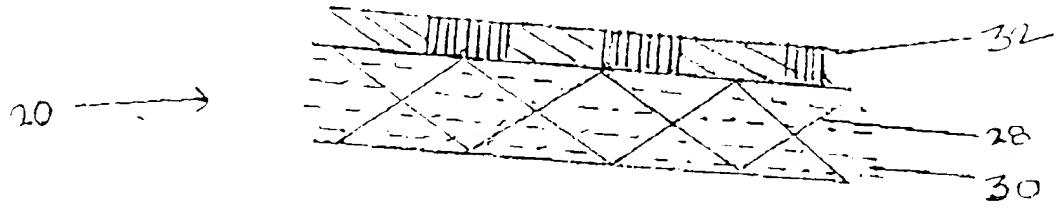

Figure 2a - Prior Art

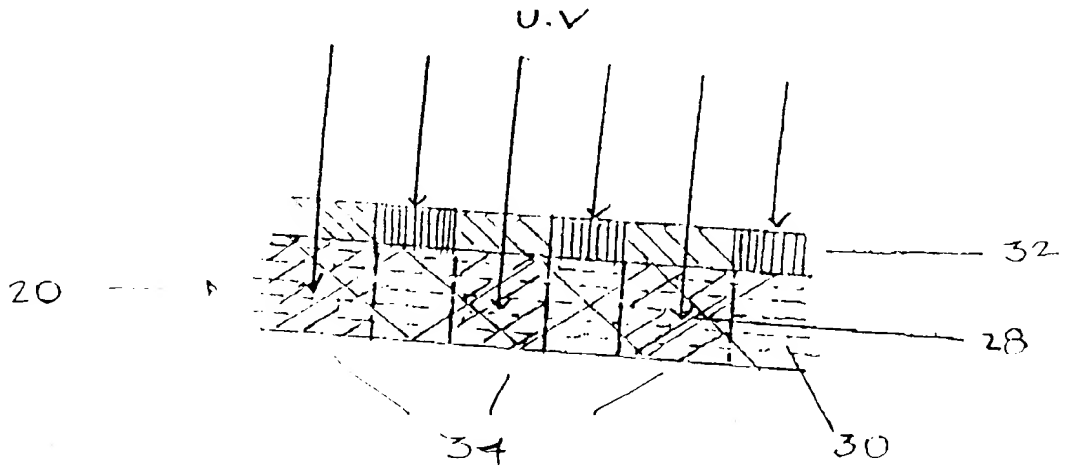

Figure 2b - Prior Art

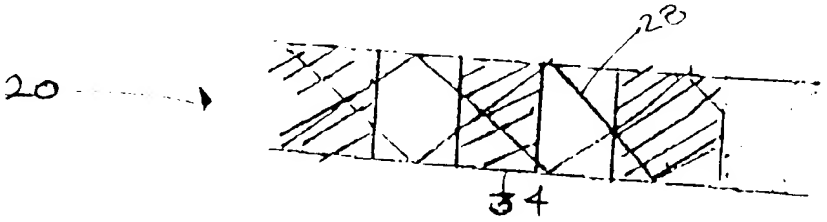

Fig. 2C - Prior Art

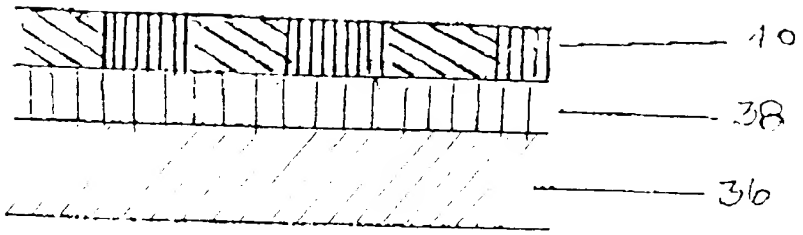

Figure 3a - Prior Art

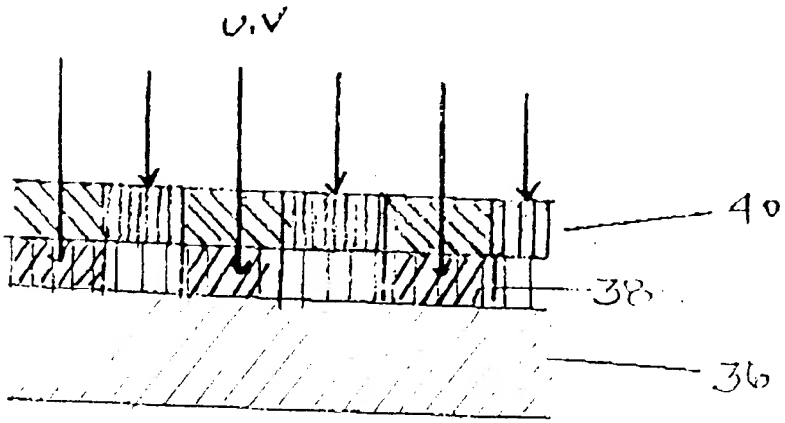

Figure 3b - Prior Art

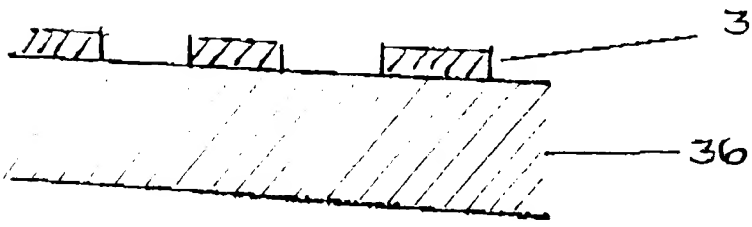

Figure 3c - Prior Art

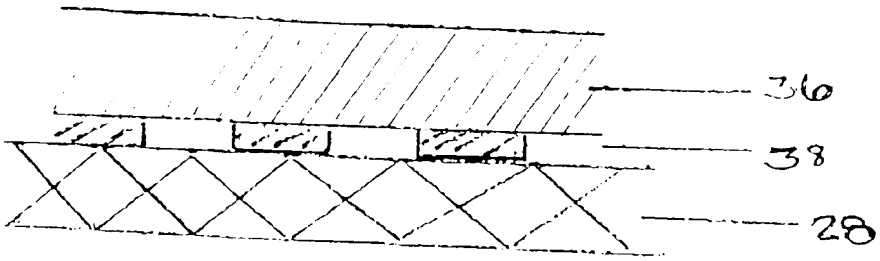

Figure 3d Prior Art

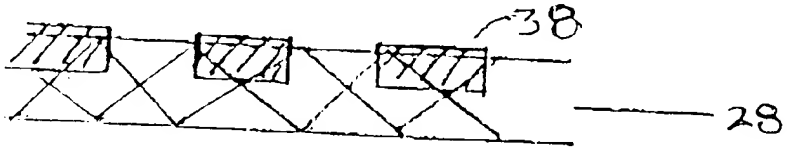

Figure 3e - Prior Art

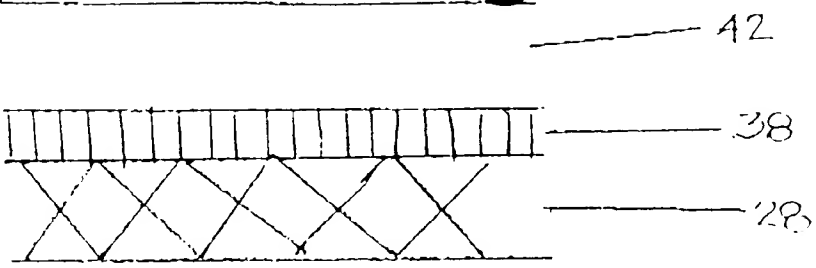

Figure 1a - Prior Art

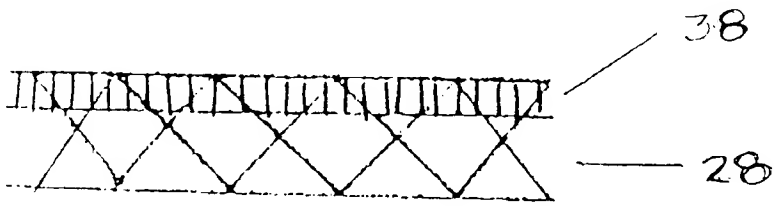

Figure 1b Prior Art

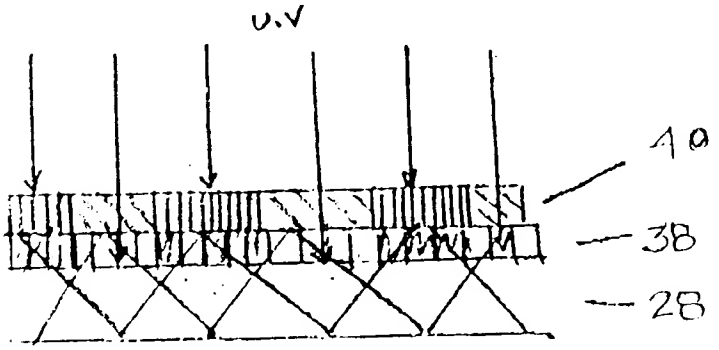

Figure 1c Prior Art

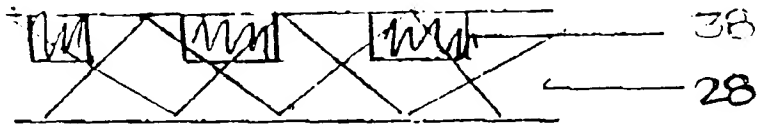

Figure 1d Prior Art

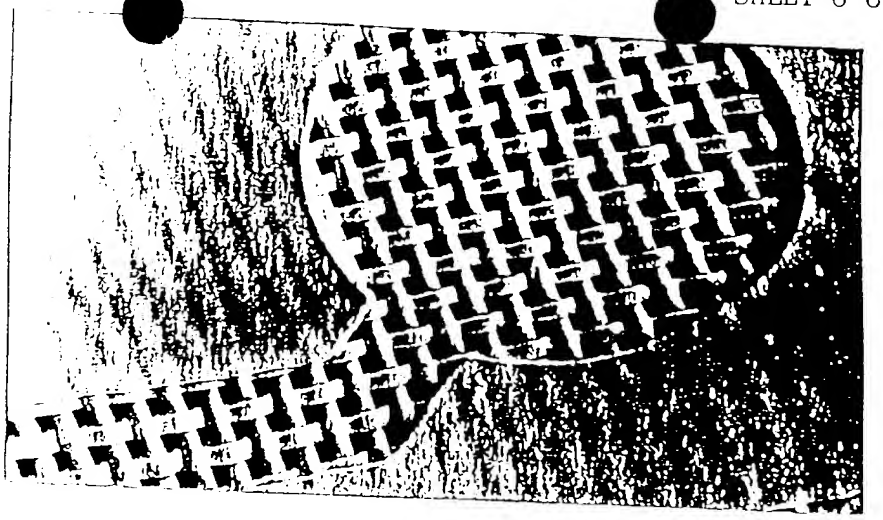

Fig. 5 - Prior Art

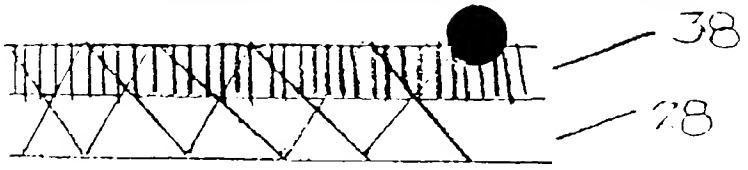

Figure 6a

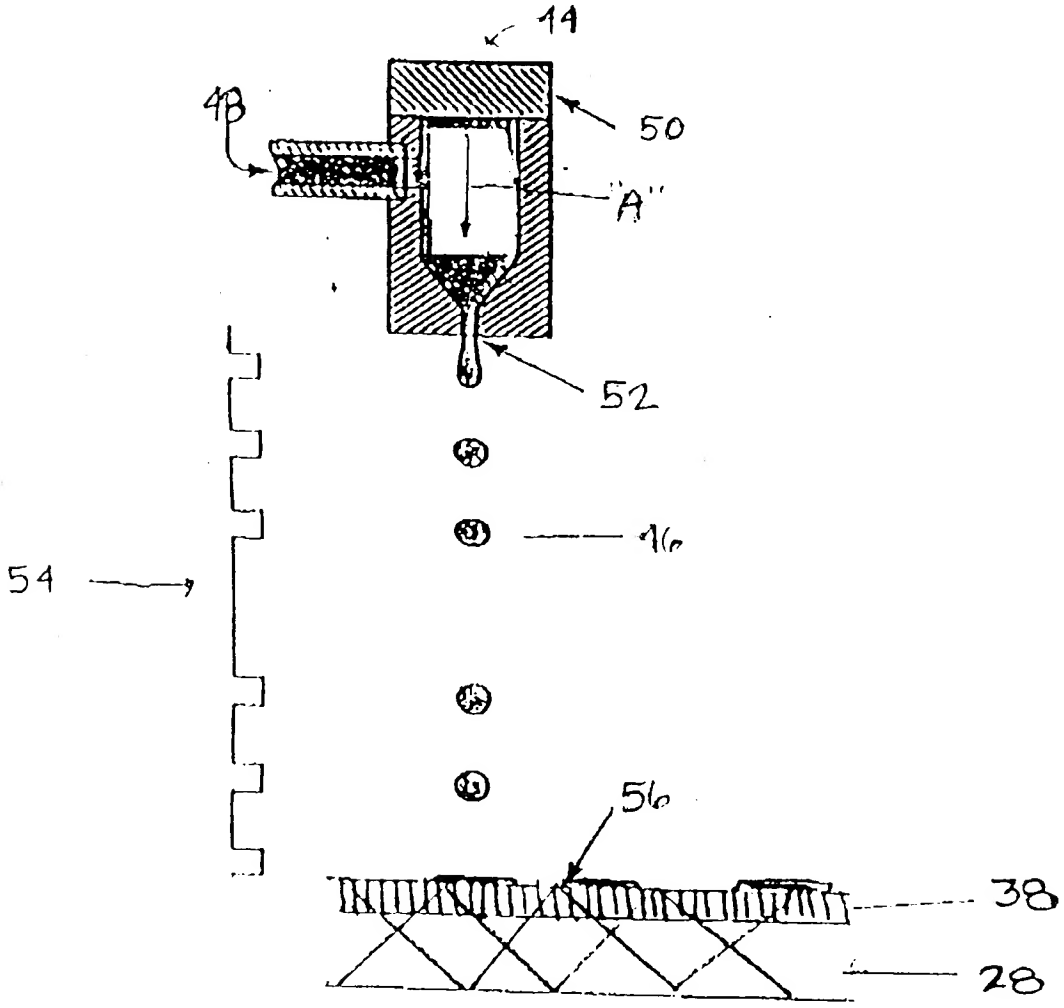

Figure 6b

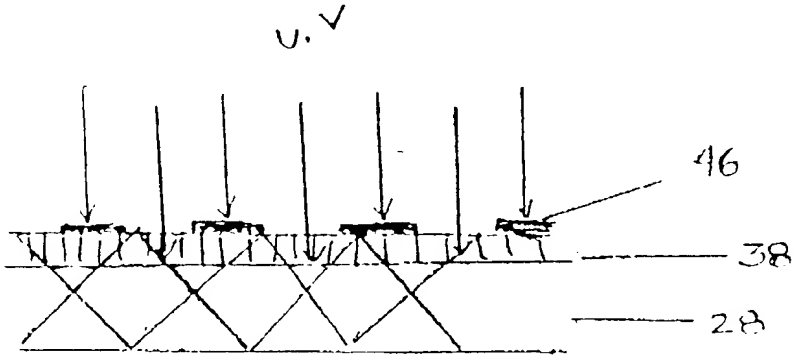

Figure 6c

Figure 6d

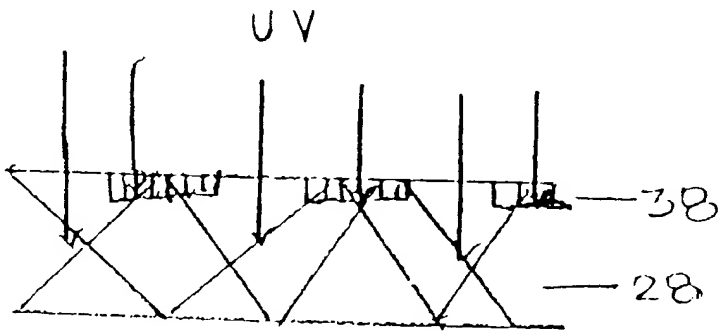

Figure 6e